

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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In re Patent Application of:  
Sean J Hart et al.

Application No.: 10/673,351

Confirmation No.: 8470

Filed: September 30, 2003

Art Unit: 1723

For: SEPARATION OF COLLOIDAL  
SUSPENSIONS USING LASER OPTICAL  
PRESSURE FLUIDIC DEVICES

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Examiner: J. W. Drodge

**APPEAL BRIEF**

MS Appeal Brief - Patents  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Dear Sir:

As required under § 41.37(a), this brief is filed more than two months after the Notice of Appeal filed in this case on July 6, 2006, and is in furtherance of said Notice of Appeal. The fees required under § 41.20(b)(2) are dealt with in the accompanying TRANSMITTAL OF APPEAL BRIEF.

This brief contains items under the following headings as required by 37 C.F.R. § 41.37 and M.P.E.P. § 1206:

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**I. REAL PARTY IN INTEREST**

The real party in interest for this appeal is: The Government of the United States of America, as represented by the Secretary of the Navy

**II. RELATED APPEALS, INTERFERENCES, AND JUDICIAL PROCEEDINGS**

There are no other appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in this appeal.

**III. STATUS OF CLAIMS**

**A. Total Number of Claims in Application**

There are 8 claims pending in application.

**B. Current Status of Claims**

1. Claims canceled: 1-10
2. Claims withdrawn from consideration but not canceled: None
3. Claims pending: 11-18
4. Claims allowed: None
5. Claims rejected: 11-18

**C. Claims On Appeal**

The claims on appeal are claims 11-18

**IV. STATUS OF AMENDMENTS**

Applicant did not file an Amendment After Final Rejection.

**V. SUMMARY OF CLAIMED SUBJECT MATTER**

The present invention is drawn to optical pressure, or more specifically, to affecting particles in a fluid via optical pressure.

An aspect of the present invention is drawn to a flowcell having a fluid pathway, for example as illustrated in Figure 1. Figure 1 illustrates optical pressure in a flowcell 140, wherein a fluid flows down the fluid pathway in a first direction (150) whereas a light beam 110 travels from a laser 100 up the fluid pathway in a second direction opposite the first direction. The light beam 110 creates optical pressure on certain particles  $Z_1$  and  $Z_2$  within the fluid in the pathway. The particles,

experiencing laser pressure, move in the direction of laser propagation, away from the focal point 130 against the liquid flow 150. The particles then come to rest when the optical pressure force on the particles equals the force due to the liquid flow (please note discussion on page 13 of the specification, the first full paragraph).

Independent claim 11 recites a device (for example as illustrated in Figure 5a) comprising: a poly(dimehtylsilozane) (PDMS) body (please note page 16, line 8 of specification) having a fluid pathway arranged to permit flow of a fluid in a first direction therethrough (please note item 510 of Figure 5a, and discussion on page 16, lines 11-12); and a light input part (please note item 530 of Figure 5a, and discussion on page 16, line 18 through page 17, line 1) arranged to accept input light and permit the input light to travel into said PDMS body and through said fluid pathway in a second direction opposite of the first direction (please note discussion of flowcell on page 14, second paragraph).

Independent claim 13 recites a device (for example as illustrated in Figure 5a) comprising: a body (please note page 16, line 8 of specification) comprising a first material and having a fluid pathway arranged to permit flow of a fluid in a first direction therethrough (please note item 510 of Figure 5, and discussion on page 16, lines 11-12); and a light input part (please note item 530 of Figure 5, and discussion on page 16, line 18 through page 17, line 1) on said body and comprising a second material, said light input part being arranged to accept input light and permit the input light to travel into said body and through said fluid pathway in a second direction opposite of the first direction (please note discussion of flowcell on page 14, second paragraph), wherein said first material is different from said second material (please note item 530 of Figure 5, and discussion on page 16, line 18 through page 17, line 1).

Independent claim 17 recites a system (please note Figure 7 and discussion on page 18, line 6 through page 19, line 12) comprising: a light source operable to emit light (item 700); and a PDMS body (please note page 16, line 8 of specification) having a fluid pathway arranged to permit flow of a fluid in a first direction therethrough (please note item 510 of Figure 5, and discussion on page 16, lines 11-12), wherein said body is arranged to accept the light and permit the light to travel into said PDMS body and through said fluid pathway in a second direction opposite of the first direction (please note discussion of flowcell on page 14, second paragraph).

## VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

A summary of the prosecution history of the above-identified application is as follows:

The Office action dated 12/19/2005 rejected original claims 1-9 (claim 10 was withdrawn as being directed to a non-elected invention) over Nishimura et al. (USPN 5,495,105). Zanger et al. (USPN 6,317,449) and two references by Wang et al. (USPN 6,815,664 and USPN 6,778,724).

The Applicants' response filed February 3, 2006, canceled claims 1-10 and added new claims 11-18 and presented arguments as to why the newly added claims are patentable over the prior art of record.

The final Office action dated March 22, 2006, rejected claims 11-18 as being anticipated by newly applied Dapprich (USPN 6,585,939).

Page 3, the second full paragraph of Applicants' after-final response filed June 12, 2006 (After Final Response), includes an argument that Dapprich fails to disclose:

"a fluid pathway arranged to permit flow of a fluid in a first direction therethrough and a light input part arranged to accept input light and permit the input light to travel into [sic] through the fluid pathway in a second direction opposite of the first direction, as required in the independent claims."

The advisory action (Advisory Action) dated 06/23/2006 indicates that the request for consideration has been considered but does NOT place the application in condition for allowance. The continuation sheet of the Advisory Action states that:

"[t]he Arguments presented in the Remarks are not persuasive. It is argues that Dapprich patent 6.585,939 fails to disclose a fluid pathway having a 'light input part' (such as a mirror or reflector) arranged to accept light from a first direction and permit such light to flow in a reverse direction. However, Dapprich discloses fluid-handling bodies such as sample holder 64 as forming a part of a microstructure in which samples are transported and dispersed, i.e. have fluid movement (see column 11, lines 59-65; column 12, lines 1-5, 10-20 and 65-67). Column 12, lines 22-26 then state that such microstructures may also comprise optical components including lenses, mirrors and other reflectors (column 12, lines 22-25 and 50-67)."

Applicants request that the Board of Appeals and Patent Interferences decide the following two issues:

1. does Dapprich disclose “a PDMS body having a fluid pathway arranged to permit flow of a fluid in a first direction therethrough” and “a light input part arranged to accept input light and permit the input light to travel into said PDMS body and through said fluid pathway in a second direction opposite of the first direction,” (emphasis added) as recited in each of independent claims 11 and 17 recites; and

2. does Dapprich disclose “a body comprising a first material and having a fluid pathway arranged to permit flow of a fluid in a first direction therethrough,” and “a light input part on said body and comprising a second material, said light input part being arranged to accept input light and permit the input light to travel into said body and through said fluid pathway in a second direction opposite of the first direction,” (emphasis added) as recited in independent claim 13?

## VII. ARGUMENT

It is respectfully submitted that Dapprich fails to disclose the above-identified limitations.

As pointed out on page 2, paragraph 3 of the After Final Response, an aspect of the present invention is drawn to a flowcell having a fluid pathway. for example as illustrated in Figure 2. A fluid flows down the fluid pathway in a first direction whereas a light beam travels up the fluid pathway in a second direction opposite the first direction. (Emphasis added) The light beam creates optical pressure on certain particles within the fluid in the pathway.

As pointed out on page 2, paragraph 4 of the After Final Response, each of independent claims 11 and 17 recites, *inter alia*.

“a PDMS body having a fluid pathway arranged to permit flow of a fluid in a first direction therethrough” and “a light input part arranged to accept input light and permit the input light to travel into said PDMS body and through said fluid pathway in a second direction opposite of the first direction.” (Emphasis Added)

As pointed out on page 2, paragraph 5 of the After Final Response, independent claim 13 recites, *inter alia*,

“a body comprising a first material and having a fluid pathway arranged to permit flow of a fluid in a first direction therethrough,” and “a light input part on said body and comprising a second material, said light input part being arranged to accept input light and permit the input light to travel into said body and through said fluid pathway in a second direction opposite of the first direction.” (Emphasis Added)

The Advisory Action seems to indicate that because a device disclosed in Dapprich is capable of accepting light from a first direction and permitting the light to flow in a reverse direction, then such a device anticipates the present invention. It is respectfully submitted that such an assertion is incorrect.

Contrary to the assertion in the Advisory Action, the After Final Response **does not argue** that Dapprich fails to disclose “a fluid pathway having a ‘light input part’ (such as a mirror or reflector) arranged to **accept light from a first direction and permit such light to flow in a reverse direction.**” (Emphasis Added) The clear language of the claims and the arguments for patentability thereof are different than the position taken in the Advisory Action.

The Advisory Action indicates that column 12, lines 22-26 and 49-67 of Dapprich states that “the disclosed microstructures, themselves, contain reflectors, mirrors and other optical devices for controlling direction of fluid flow.” This statement is incorrect. The cited portion of Dapprich in no way indicates that the reflectors, mirrors and other optical devices are for “controlling the direction of fluid flow.” In any event, the exact subject matter claimed must be described by the allegedly anticipating reference. *C.R. Bard, Inc. v. M3 Sys., Inc.*, 157 F.3d 1340, 1349 (Fed. Cir. 1998). In the present case, Dapprich fails to disclose the exact subject matter recited in independent claims 11, 13 and 17. More specifically, Dapprich fails to disclose:

**“a PDMS body having a fluid pathway arranged to permit flow of a fluid in a first direction therethrough” and “a light input part arranged to accept input light and permit the input light to travel into said PDMS body and through said fluid pathway in a second direction opposite of the first direction;” or** (Emphasis Added)

**“a body comprising a first material and having a fluid pathway arranged to permit flow of a fluid in a first direction therethrough,” and “a light input part on said body and comprising a second material, said light input part being arranged to accept input light and permit the input light to travel into said body and through said fluid pathway in a second direction opposite of the first direction.”** (Emphasis Added)

Dapprich generally discloses optical devices with microfluidic structures as follows:

- Column 12, lines 22-26 discloses that the, “microstructures of the present invention may also comprise one or more optical components, including refractive and reflective

components such as lenses and mirrors, and diffractive components such as input-coupler gratings, frsnel lenses, and holographic components.”

- Column 12, lines 27-43 discloses techniques for manufacturing microstructures comprising one or more optical components.

- Column 12, lines 47-58 discloses an embodiment of a microstructure having a concave reflective surface. As illustrated in FIG. 9, light 68, from sample 70 is reflected off concave reflecting surface 62 and onto detector 66.

- Column 12, line 59 through column 13, line 44 provide a litany of examples of optical devices in microstructures including: diffractive optical elements “for sample illumination or readout such as total internal reflection and evanescent wave excitation (Column 13, lines 3-14); optical additives “to suppress excitation light scattering and internal fluorescence, including PDMS autofluorescence, while permitting a desired signal (c.g., sample fluorescence) to penetrate a microstructure to a detector (Column 13, lines 16-29); and waveguides “for localized excitation of samples within a microstructure at specific wavelengths” (Column 13, lines 30-43).

Nowhere within Daprich is a disclosure of fluid flowing down a fluid pathway in a first direction whereas a light beam travels up the fluid pathway in a second direction opposite the first direction. Accordingly, Daprich fails to disclose that which is recited in independent claims 11, 13 and 17. Because Daprich fails to disclose the exact subject matter recited in independent claims 11, 13, and 17, in light of *C.R. Bard, Inc. v. M3 Sys., Inc.*, 157 F.3d 1340, 1349 (Fed. Cir. 1998), claims 11, 13 and 17 are novel over Daprich within the meaning of 35 U.S.C. § 102.

In light of the above, it is clear that claims 11-18 are novel over the prior art of record, an indication of which is respectfully solicited.

## VIII. CLAIMS

A copy of the claims involved in the present appeal is attached hereto as Appendix A. As indicated above, the claims in Appendix A do include the amendments filed by Applicant on February 23, 2006.

**IX. EVIDENCE**

No evidence pursuant to §§ 1.130, 1.131, or 1.132 or entered by or relied upon by the examiner is being submitted.

**X. RELATED PROCEEDINGS**

No related proceedings are referenced in II. above, or copies of decisions in related proceedings are not provided, hence no Appendix is included.

Dated: September 19, 2006

Respectfully submitted,

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**APPENDIX A**

**Claims Involved in the Appeal of Application Serial No. 10/673,351**

**11. A device comprising:**

a PDMS body having a fluid pathway arranged to permit flow of a fluid in a first direction therethrough; and

a light input part arranged to accept input light and permit the input light to travel into said PDMS body and through said fluid pathway in a second direction opposite of the first direction.

**12. The device of claim 11, further comprising a light manipulating part operable to manipulate the input light to travel through a specific portion of said fluid pathway.**

**13. A device comprising:**

a body comprising a first material and having a fluid pathway arranged to permit flow of a fluid in a first direction therethrough; and

a light input part on said body and comprising a second material, said light input part being arranged to accept input light and permit the input light to travel into said body and through said fluid pathway in a second direction opposite of the first direction,

wherein said first material is different from said second material.

**14. The device of claim 13, wherein said body comprises PDMS.**

**15. The device of claim 13, wherein said light input part comprises glass.**

16. The device of claim 13, further comprising a light manipulating part operable to manipulate the input light to travel through a specific portion of said fluid pathway.

17. A system comprising:

a light source operable to emit light; and

a PDMS body having a fluid pathway arranged to permit flow of a fluid in a first direction therethrough,

wherein said body is arranged to accept the light and permit the light to travel into said PDMS body and through said fluid pathway in a second direction opposite of the first direction.

18. The device of claim 17, further comprising a light manipulating part operable to manipulate the input light to travel through a specific portion of said fluid pathway.